

An Accuracy Assessment of Multiple Mid-Atlantic Sub-pixel Impervious Surface Maps

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Anthropogenic impervious surfaces have an important relationship with non-point source pollution (NPS) in urban watersheds. The amount of impervious surface area in a watershed is a key indicator of landscape change. As a single variable, it serves to integrate a number of concurrent interactions that directly influence a watershed's hydrology, stream chemical quality, and, thus, in-stream habitat. Although numerous research efforts have explicitly mapped impervious surfaces at the local scale using high-resolution remote sensing sources, few studies have attempted to explicitly map the variable at the regional scale using medium remote sensing sources, such as Landsat imagery. Recent image-processing advances have allowed impervious surface area to be mapped at the Landsat sub-pixel level, and several Landsat sub-pixel mapping efforts in the mid-Atlantic region have been undertaken. The problem for the environmental community is determining at what level of accuracy these sub-pixel maps portray impervious surfaces and at what scale these maps can be adequately utilized.

A "truth" mapping protocol as set forth in the United States Geological Survey (USGS) prospectus, "Shared assessment of USGS and NGO impervious surface data-sets for the Chesapeake Bay Watershed," will be implemented to create a set of 600 "truth" impervious surface chips derived from high spatial resolution imagery. A USEPA peer-reviewed accuracy assessment (AA) protocol has been established that will be the basis for testing the sub-pixel impervious surface maps of the mid-Atlantic region produced by the USGS, University of Maryland, College Park, and Towson University, respectively.

Our research partners are the USGS National Mapping Division (NMD) in Reston, VA, the Chesapeake Bay Program in Annapolis, MD, as well as the University of Maryland, College Park, and Towson University in Baltimore, MD. The requestor and primary user of the accuracy assessment results will be the Chesapeake Bay Program, where it is necessary to know the statistical uncertainty at multiple spatial scales involved with the data. However, all users of landscape data, from local to Federal and NGOs, within the Chesapeake Bay watershed will apply the results of the AA. Additionally, The NLCD00 mapping program will also use the results to determine the relevance of their national-level sub-pixel mapping program.